IN THE CLAIMS

1. (Original) An apparatus comprising:

an integrated circuit (IC) die; and

a thermal mass coupled to the IC die, wherein the thermal mass comprises a stacked microchannel heat exchanger.

2. (Original) The apparatus of claim 1, wherein the thermal mass is thermally and operatively coupled to the IC die by a layer of solder disposed between the thermal mass and the surface of the IC die.

3. (Original) The apparatus of claim 2, wherein the layer of solder comprises interstitial solder.

4. (Original) The apparatus of claim 1, wherein the thermal mass is thermally and operatively coupled to the IC die by an adhesive disposed between the thermal mass and the surface of the IC die.

5. (Original) The apparatus of claim 4, wherein the adhesive comprises a thermal adhesive.

6. (Original) The apparatus of claim 4, wherein the adhesive comprises a silicon to silicon bonding adhesive.

7. (Original) The apparatus of claim 6, wherein the adhesive comprises a polymer compound.

8. (Original) The apparatus of claim 7, wherein the adhesive comprises bisbenzocyclobutene.

9. (Original) The apparatus of claim 1, wherein the thermal mass is thermally coupled to the IC die by a thermal interface material (TIM) layer.

10. (Original) The apparatus of claim 1, further comprising a substrate to which the IC die is flip-bonded.

11. (Original) The apparatus of claim 10, wherein the thermal mass is operatively coupled to the substrate via a plurality of fasteners.

12. (Original) The apparatus of claim 11, further comprising a plurality of standoffs physically coupled to the substrate and to which the plurality of fasteners are physically coupled

13. (Original) The apparatus of claim 1, further comprising:

a solderable layer formed on the IC die; wherein the thermal mass is thermally and operatively coupled to IC die by the solderable layer.

14. (Original) The apparatus of claim 13, wherein the solderable layer is formed from at least one of the following metals: copper (Cu), gold (Au), nickel (Ni), aluminum (Al), titanium (Ti), tantalum (Ta), silver (Ag) and Platinum (Pt).

15. (Original) The apparatus of claim 13, wherein the solderable layer and the thermal mass are made of substantially similar metals.

16. (Original) An apparatus comprising:

an integrated circuit (IC) package, said IC package containing one or more IC dies; and

a thermal mass coupled to the IC package, wherein the thermal mass comprises a stacked microchannel heat exchanger.

17. (Original) The apparatus of claim 16, wherein the thermal mass is thermally and operatively coupled to the IC die by a layer of solder disposed between the thermal mass and the surface of the IC die.

18. (Original) The apparatus of claim 17, wherein the layer of solder comprises interstitial solder.

19. (Original) The apparatus of claim 16, wherein the thermal mass is thermally and operatively coupled to the IC die by an adhesive disposed between the thermal mass and the surface of the IC die.

20. (Original) The apparatus of claim 19, wherein the adhesive comprises a thermal adhesive.

21. (Original) The apparatus of claim 19, wherein the adhesive comprises a silicon to silicon bonding adhesive.

22. (Original) The apparatus of claim 21, wherein the adhesive comprises a polymer compound.

23. (Original) The apparatus of claim 22, wherein the adhesive comprises bisbenzocyclobutene.

24. (Original) The apparatus of claim 16, wherein the thermal mass is thermally coupled to the IC die by a thermal interface material (TIM) layer.

25. (Original) The apparatus of claim 16, further comprising a substrate to which the IC die is flip-bonded.

26. (Original) The apparatus of claim 25, wherein the thermal mass is operatively coupled to the substrate via a plurality of fasteners.

27. (Original) The apparatus of claim 26, further comprising a plurality of standoffs physically coupled to the substrate and to which the plurality of fasteners are physically coupled

28. (Original) The apparatus of claim 16, further comprising:

a solderable layer formed on the IC die; wherein the thermal mass is thermally and operatively coupled to IC die by the solderable layer.

29. (Original) The apparatus of claim 28, wherein the solderable layer is formed from at least one of the following metals: copper (Cu), gold (Au), nickel (Ni), aluminum (Al), titanium (Ti), tantalum (Ta), silver (Ag) and Platinum (Pt).

30. (Original) The apparatus of claim 28, wherein the solderable layer and the thermal mass are made of substantially similar metals.

31. (Original) A system, comprising:

an integrated circuit (IC) die;

a stacked microchannel heat exchanger operatively and thermally coupled to the IC die;

a pump, having an inlet and an outlet, said outlet fluidly coupled to an inlet of the stacked microchannel heat exchanger; and

a heat rejecter, having an inlet fluidly coupled to an outlet of the stacked microchannel heat exchanger and an outlet fluidly coupled to the inlet of the pump,

wherein the system employs a working fluid that transfers heat generated by the IC die to the heat rejecter using a two-phase heat exchange mechanism.

32. (Original) The system of claim 31, wherein the working fluid is water.

33. (Original) The system of claim 31, wherein the pump comprises an electro osmotic pump.

34. (Original) The system of claim 31, wherein the stacked microchannel heat exchanger is thermally and operatively coupled to the IC die by a layer of solder disposed between the stacked microchannel heat exchanger and the surface of the IC die.

35. (Original) The system of claim 31, wherein the stacked microchannel heat exchanger is thermally and operatively coupled to the IC die by an adhesive disposed between the stacked microchannel heat exchanger and the surface of the IC die.

36. (Original) The system of claim 31, wherein the stacked microchannel heat exchanger is thermally coupled to the IC die by a thermal interface material (TIM) layer.

37. (Original) The system of claim 31, further comprising:

a solderable layer formed on the IC die, wherein the stacked microchannel heat exchanger is operatively and thermally coupled to the IC die by the solderable layer.

38. (Original) A system, comprising:

an integrated circuit (IC) package;

a stacked microchannel heat exchanger operatively and thermally coupled to the IC die;

a pump, having an inlet and an outlet, said outlet fluidly coupled to an inlet of the stacked microchannel heat exchanger; and

a heat rejecter, having an inlet fluidly coupled to an outlet of the stacked microchannel heat exchanger and an outlet fluidly coupled to the inlet of the pump,

wherein the system employs a working fluid that transfers heat generated by the IC die to the heat rejecter using a two-phase heat exchange mechanism.

39. (Original) The system of claim 38, wherein the working fluid is water.

40. (Original) The system of claim 38, wherein the pump comprises an electro osmotic pump.

41. (Original) The system of claim 38, wherein the stacked microchannel heat exchanger is thermally and operatively coupled to the IC package by a layer of solder disposed between the stacked microchannel heat exchanger and the surface of the IC package.

42. (Original) The system of claim 38, wherein the stacked microchannel heat exchanger is thermally and operatively coupled to the IC package by an adhesive disposed between the stacked microchannel heat exchanger and the surface of the IC package.

43. (Original) The system of claim 38, wherein the stacked microchannel heat exchanger is thermally coupled to the IC package by a thermal interface material (TIM) layer.

44. (Original) The system of claim 38, further comprising:

a solderable layer formed on the IC package, wherein the stacked microchannel heat exchanger is operatively and thermally coupled to the IC package by the solderable layer.

45. (Original) A system comprising:

an integrated circuit (IC) die;

a network interface;

an antenna coupled to the network interface;

a bus, said bus coupling the IC die to the network interface; and

a thermal mass coupled to the IC die, the thermal mass comprising a stacked microchannel heat exchanger.

46. (Original) The system of claim 45, wherein the stacked microchannel heat exchanger is thermally and operatively coupled to the IC die by a layer of solder disposed between the stacked microchannel heat exchanger and the surface of the IC die.

47. (Original) The system of claim 45, wherein the stacked microchannel heat exchanger is thermally and operatively coupled to the IC die by an adhesive disposed between the stacked microchannel heat exchanger and the surface of the IC die.

48. (Original) The system of claim 45, wherein the stacked microchannel heat exchanger is thermally coupled to the IC die by a thermal interface material (TIM) layer.

49. (Original) The system of claim 45, further comprising:

a solderable layer formed on the IC die, wherein the stacked microchannel heat exchanger is operatively and thermally coupled to the IC die by the solderable layer.

50. (Original) A system comprising:

an integrated circuit (IC) package;

a network interface;

an antenna coupled to the network interface;

a bus, said bus coupling the IC package to the network interface; and

a thermal mass coupled to the IC package, the thermal mass comprising a stacked microchannel heat exchanger.

51. (Original) The system of claim 50, wherein the stacked microchannel heat exchanger is thermally and operatively coupled to the IC package by a layer of solder disposed between the stacked microchannel heat exchanger and the surface of the IC package.

52. (Original) The system of claim 50, wherein the stacked microchannel heat exchanger is thermally and operatively coupled to the IC package by an adhesive disposed between the stacked microchannel heat exchanger and the surface of the IC package.

53. (Original) The system of claim 50, wherein the stacked microchannel heat exchanger is thermally coupled to the IC package by a thermal interface material (TIM) layer.

54. (Original) The system of claim 50, further comprising:

a solderable layer formed on the IC package, wherein the stacked microchannel heat exchanger is operatively and thermally coupled to the IC package by the solderable layer.

55. (Original) A method; comprising:

thermally coupling at least one stacked microchannel heat exchanger to at least one IC;

passing a working fluid through the at least one stacked microchannel heat exchanger;

transferring heat produced by the at least one IC via the at least one stacked microchannel heat exchanger to the working fluid to convert a portion of the working fluid passing through the microchannels in the at least one stacked microchannel heat exchanger from a liquid to a vapor phase; and

passing the working fluid exiting the at least one stacked microchannel heat exchanger through a heat rejecter, wherein the vapor phase portion of the working fluid is converted back to a liquid phase.

56. (Original) The method of claim 55, wherein the at least one IC includes a processor IC and at least one additional component from the following group: a platform chipset IC, a video IC, a memory IC and a co-processor IC.

57. (Original) The method of claim 55, wherein the working fluid comprises water.

58. (Original) The method of claim 55, wherein the working fluid is passed through the at least one stacked microchannel heat exchanger and heat rejecter via a electro-osmotic pump.

59. (Original) The method of claim 55, wherein the heat rejecter comprises a channeled heat sink including a plurality of hollow heat sink fins having respective channels defined therein.

60. (Original) The method of claim 55, wherein the heat rejecter comprises a stacked microchannel heat exchanger.